

Patent claims

1. A method of treating pulp i.e. fiber suspensions of the paper and wood
5 processing industry, by which method
- low consistency pulp is taken into a pre-thickener,
 - liquid is removed from the pulp in said pre-thickener essentially by means of the effect of the feeding pressure of the pre-thickener,
 - a layer of thickened pulp is allowed to be formed on the filter surface.
 - 10 - said layer of thickened pulp is wiped off the filter surface of said pre-thickener with a cleaning member, and
 - the thickened pulp and the filtrate are discharged from said apparatus,
characterized in that
 - the layer of thickened pulp is pushed by said cleaning member along said
15 filter surface to the discharge end of the apparatus in essentially axial direction,
 - at the same time the essentially non-thickened pulp is allowed to flow through the apparatus from the feeding end to the discharge end via the space between said cleaning member and the shaft of the apparatus, and
 - part of said essentially non-thickened pulp flow is guided to the filter surface
20 portion being wiped by the cleaning member.
2. A method according to claim 1, characterized in that pulp is taken into said pre-thickener (10) from a screen (2), the screening consistency of which is about 2 – 4 %.
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3. A method according to claim 1, characterized in that the pulp thickened by the prethickener (10) is taken into a filter (4), the feeding consistency of which is 3 – 6 %.

4. A method according to claim 2 and 3, characterized in that between the screen (2) and the filter (4) the consistency of the pulp is raised by said pre-thickener (10) by 1 – 4 %.
5. A method according to claim 1, characterized in that the rotational speed of said pre-thickener is such as to create for the thickened layer of pulp a speed less than 3 m/s towards the discharge end of the apparatus.
6. A method according to claim 5, characterized in that said speed is between 0.2 – 1.0 m/s, preferably about 0.5 m/s.
7. A method according to claim 1, characterized in that the feeding speed of the screw and the flow speed of the non-thickened pulp are essentially the same at the discharge end of the apparatus.
8. A method according to claim 1, characterized in that the feeding pressure of the apparatus is created by means of a pump.
9. A method according to claim 1, characterized in that the thickening of the pulp is controlled with valves regulating the flow of incoming pulp, filtrate and/or thickened material.
10. A method according to claim 1, characterized in that the flow speed of the pulp in the apparatus is regulated by means of valves for the filtrate and/or the thickened material.
11. A method according to claim 9, characterized in that the consistency of the thickened pulp is regulated to the desired value by changing the flow amount ratio of the thickened pulp and the filtrate.

12. A method according to claim 9, characterized in that the consistency of the thickened pulp is regulated to the desired value by changing the flow amount ratio of the pulp to be thickened and the filtrate.

5 13. A method according to claim 9, characterized in that said regulation is controlled on the basis of the input power or input torque of said cleaning member.

10 14. A method according to claim 9, 11, 12 or 13, characterized in that said regulation is controlled by maintaining a constant pressure difference over the filter surface.

15 15. A method according to claim 9, characterized in that said regulation is controlled on the basis of an impulse from a previous or later process stage.

16. A method according to claim 9, characterized in that said regulation is controlled by changing the rotational speed of the cleaning member.

17. A method according to claim 1, characterized in that said filtrate is used for dilution in a previous process stage.

20 18. A method according to claim 1, characterized in that said filtrate is used for dilution in the same process stage.

25 19. A method according to claim 1, characterized in that fibers are separated from said filtrate by a fiber separating means prior to reusing the filtrate.

30 20. An apparatus for treating pulp, which apparatus (10) comprises an essentially elongated outer casing (12), the first end of which is closed with an end plate (14); at the first end of which casing there is arranged an inlet conduit (18) for the fiber suspension to be treated P_{in} ; the other end of which casing is closed with an end plate

(16); at said other end of which casing there is arranged a discharge conduit (20) for the thickened fiber suspension P_{out} being discharged from the apparatus; which casing (12) is provided with a discharge conduit (26) for the filtrate F_{out} ; inside which casing (12) essentially at least between the inlet conduit (18) and the discharge conduit (20) there is arranged a filter surface (22) having a preferably round cross section and arranged inside it a cleaning member comprising a rotating shaft (30), on which shaft at least one screw thread (32) is fixed for keeping the filter surface (22) clean, characterized in that the discharge conduits (20; 26) for the thickened pulp and the filtrate are provided with valves (40; 46) for controlling the operation of the pre-thickener.

21. An apparatus according to claim 20, characterized in that said valves are controlled according to the input power of the shaft (30), on the basis of an impulse from a previous process stage or pressure difference prevailing over the filter surface.

22. An apparatus according to claim 20, characterized in that the screw thread (32) is fixed on the shaft (30) by means of tie rods which leave a free space between the shaft and the screw thread.

23. An apparatus according to claim 22, characterized in that the clearance of the screw thread (32) from the filter surface (22) is less than 5 mm.

24. An apparatus according to claim 22, characterized in that the clearance of the screw thread (32) from the filter surface (22) is less than 3 mm and suitably 0.2 – 2 mm.

25. An apparatus according to claim 22, characterized in that the screening surface (22) is provided with essentially axial grooves or corresponding guides which prevent the fiber mat from rotating inside the filter surface (22).

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